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# SCIENCE NEWS LETTER

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Subsurface Fusion

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A SCIENCE SERVICE PUBLICATION

TWENTY-FIFTH ANNIVERSARY

1944

PHYSICS-OCEANOGRAPHY

# Upper Air, Undersea War

Possible wars in the atomic age take research into the ionosphere and under the surface of the sea; reports wirelessly from Bikini by Science Service correspondent.

► TWO WILDERNESSES of the world—the upper atmosphere and the vast reaches of water beneath the surface of the sea—are the regions toward which military men and scientists are turning as major media through which, if diplomacy fails again, wars of the atomic age will be conducted. Test “Baker” at Bikini Lagoon drew attention to these possibilities, and may provide some data on the subsurface future.

Two major reasons can be seen for this trend: first, it is necessary for military men, who are charged with the job, to seek places in which machines of war can operate with some safety from the very efficient means of counterattack now available and from which attacks on an enemy can be launched successfully; and, second, atomic power itself may make it possible to build the types of planes and submarines which would have to be constructed to survive in these regions.

A number of pieces can be fitted together to make a credible pattern of this future.

As for the use of atomic power in new war weapons, Dr. Glenn T. Seaborg, University of California chemist and a leader in atomic bomb research, said in a recent lecture:

“It may be even feasible sometime in the future to use atomic power plants in large submarines, giving to such vessels the highly desirable advantage of extremely long cruising ranges. It is also probably not out of the question that such power plants might be used for the propulsion of some of the very large airplanes which are being planned for the future. One must not lose sight of the possibility that new improvements in shielding arrangements, etc., will make it possible to reduce appreciably the bulk of the installations.”

Dr. Seaborg was referring to the fact that, with present knowledge, an atomic power plant would have to be surrounded with thick, heavy shielding to protect personnel from deadly radiations.

This scientific viewpoint was strengthened from a practical military viewpoint in a magazine article by Admiral Chester W. Nimitz, in which he posed the pos-

sibility that the Navy may find the submarine its most effective weapon if wars come again.

With the coming of the V rockets and the inevitable improvements on them, air-minded military men and scientists who are concerned with the higher reaches of the atmosphere are thinking in terms which may parallel in their domain the developments under the sea.

## Two Fields Similar

Strangely enough, the upper atmosphere and the subsurface, seemingly at opposite poles so far as the earth is concerned, are quite similar environments in many respects. Temperature, density, and wave variations are very closely related. The physical laws that govern the movement of sound in the two regions—the equations which inexorably dictate the details of these phenomena—are the same, though they may differ in magnitude. Much of the evidence for this was found during World War II.

Push-button warfare, winged missiles carrying atomic warheads thousands of miles, is not a likely prospect until the middle 1950's, Rear Adm. W. S. Parsons, deputy task force commander for technical direction, has stated.

Adm. Parsons said the upper atmosphere or the ionosphere—that part of the air from about 40 to 400 miles above the earth's surface—would be a major medium of warfare in any future world war. He pointed out, however, that much scientific research must be done first.

“You can be sure that when we can bounce radar signals off the moon,” Adm. Parsons said, “it is possible to penetrate all layers of the air envelope around the earth with radio waves. It is indicated, therefore, that we can send guided missiles through the upper atmosphere.”

Adm. Parsons, who recently was assigned to a Navy guided missiles program, added that the advantages in any future war to using an atomic bomb warhead on a guided missile make expenditure of large sums of money on research a military necessity. He said that the German V-2 rocket is not strictly a guid-

ed missile because control is lost after launching.

The lines that research in the upper atmosphere will take have been indicated clearly by scientists, prominent among whom is Dr. Joseph Kaplan, professor of physics at the University of California at Los Angeles.

Following on the heels of the German V-2 which recently ascended to an altitude in excess of 75 miles, robot rockets directed from earth will penetrate even farther into the ionosphere. Equipped with vacuum chambers opening automatically when low enough pressures are reached, they will sample the air at that level, collect it and return it to earth for chemical analysis. These samples may help determine among other things whether the earth is losing its atmosphere by dissipation into outer space. A spectroscope which permits the identification of elements in distant objects by spreading light received from them may be sent into the ionosphere in such a rocket.

## Studying Cosmic Rays

Already under way is a Navy-sponsored project for studying cosmic rays in airplanes to 40,000 feet, which indicates the possibility of sending equipment into the ionosphere in rockets to study these rays.

Dr. Kaplan says that while only a beginning has been made on upper air research, there is a good nucleus of knowledge. The ionosphere lies above both the troposphere, extending about six miles above earth, in which weather occurs, and the stratosphere which reaches from six to 40 miles.

Even some knowledge of temperature is obtained with sound waves which are affected by changes in heat. More data on temperature are obtained from meteorites which are heated by friction with the air. This makes it possible to calculate air density and temperature at a height where meteors appear. Deadly ultraviolet radiations from the sun exist above the ozone layer which begins at 15 miles and extends upward 18 miles. Ozone stops these radiations from reaching the earth's inhabitants.

High in upper atmosphere the sky disappears and surroundings are completely black. The sky we see is actually nothing more than a scattering of the sun's rays by atmosphere. Great electrical storms rage through the ionosphere, usually during sunspot activity, creating flaming displays such as the aurora borealis.

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## ATOMIC ENERGY

# Fifth Atomic Bomb Blast

The underwater explosion could be likened to the bursting of a giant nova or to an enormous sea monster lashing in agony. But the bomb is a very real matter.

By DANIEL WILKES

Science Service Crossroads Correspondent  
Wirelessed from Bikini

► THE GATES of hell yawned briefly across a peaceful stretch of the Pacific and then clanged shut with the fury of a thousand monsters and steaming radioactive water.

The fifth atomic bomb had been born and died—breaking surface like a Beowulf sea monster lashing in primordial agony at the sea and the test ships spaced neatly in the lagoon.

That was my first reaction to the underwater explosion of an atomic bomb viewed through binoculars. A column of water in brown colors hurtled into the air at a speed of 2,000 feet per second, followed by a breaking at the top. At the bottom were much greater billowing white and beige clouds, which spread quickly at first and then more slowly, hugging the sea surface. In a few minutes the central target area was obscured for perhaps a diameter of two miles.

The top cloud broke first into a dirty brown color, spreading into a luminous white mass which was soon lost in nature's clouds.

The underwater blast shook our ship slightly soon after the column appeared, followed about a minute later by blast and distant boom which rocked the vessel as though it had hit a high wave.

Within an hour the target area cleared, and nearly two hours later, the surface cloud, diffused but still visible, moved toward the horizon like a sickly fog hugging the sea.

While the Arkansas had gone down, the Saratoga, badly damaged, and other ships, were listing.

There was a water-cooled, cushioned fire of a hundred-million degrees at the center of the explosion. There were no dead people in the lagoon; none were dying which deadly gamma radiation would have rendered us powerless to rescue. There were no raging fires which, like heathen suns, lighted Nagasaki and Hiroshima.

It was hard two hours later to hold

onto one's first reaction. Normalcy had returned to our ship, and the scene was much the same as it had been before the blast.

In a different magnitude, seeing the explosion of the atomic bomb was like watching from the safe distance of the earth a super nova explode in some great island universe a hundred-billion miles away.

To many watching men it was an impersonal spectacle of only transitory interest. But such a detached attitude toward the atomic bomb is unreal for it is a personal thing to every man. It can be aimed at him.

To appreciate the spectacle in the lagoon, the observer must don goggles of retrospect and project himself over 10 miles of peaceful Pacific into a holocaust where concussion, heat and deadly radiations are making a small area of earth as untenable as the surface of a nova in the distant sky. He must know the things which are unseen in a column of smoke and unheard in a distant boom.

When, through these goggles, he gains capacity to think in terms of a rain of such novae on his city, then he becomes quite sure that only by making the bomb a personal thing can its influence over the earth be interpreted.

**See Front Cover**

The picture on the front cover of this SCIENCE NEWS LETTER, which is a Joint-Army-Navy Task Force One radio-telephoto through Acme, shows the tremendous column of water and clouds rising out of the lagoon as the atomic bomb was exploded July 25. Crossroads officials would not disclose the identity of the closest ship shown in this view of the blast.

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## GEOLOGY

## Atomic Blast Proves Darwin Theory on Atolls

► DARWIN WAS right. His century-old theory, that coral atolls were formed by the growth of coral on the top of slowly submerging volcanoes, has been given positive support by seismographs that recorded the movement of artificial earthquake waves started by the first atom-bomb explosion, on July 1. Dr. R. M. Tripp, seismologist with Joint Task Force One, states that these waves



Joint Army-Navy Task Force One Radio-Photo through Acme

**"OLD SAILOR" DIES**—The historic aircraft carrier Saratoga flashes her big "3" in the bright Pacific sun before vanishing under the surface of Bikini lagoon. An atomic bomb has accomplished what Japanese forces tried vainly to do during World War II. Still visible in the foreground is the peak of the ship's mast.



were reflected in a pattern showing that the atoll consists of a mass of coral 7,000 or 8,000 feet thick, on top of a solid mass of rough rock.

A rival theory, that atolls were built by coral growth on top of flat submarine

platforms, is apparently knocked out. The seismic waves did not come back up as they would have if they had been reflected from a flat surface of underlying rock.

*Science News Letter, August 3, 1946*

#### MEDICINE

## Facts On Plasma Rumor

**Fear that diseases are spread by blood plasma collected by Red Cross unwarranted. Experts prove that risk is very slight.**

► YOU MAY have been hearing alarming rumors about diseases being spread to men in the armed forces and even to civilians through the blood plasma collected by the American Red Cross during the war and now being collected for civilian needs.

You need not be alarmed by these rumors. The risk is very slight. Here are the facts:

An occasional lone lot, or more often, a lone bottle, of dried plasma has contained some element, probably a virus, that is thought to be the cause of a kind of jaundice called homologous serum jaundice. A person getting this may develop jaundice one to three months after the transfusion.

This same material might be in any blood or blood plasma used for transfusions. Doctors first became aware of the situation during the war. Similar cases of jaundice have been seen following use of convalescent serum in measles and mumps and yellow fever vaccine when that was made with human blood serum. The yellow fever vaccine is now made without human serum.

The jaundice is very occasionally fatal.

Common disease germs are completely eliminated in the processing of blood plasma for the Red Cross. Tests are made of donated blood to rule out any carrying the spirochetes of syphilis.

Donors are selected and their blood taken for the Red Cross according to rigid, never relaxed standards set up by the Army Medical Corps. These standards provide both for the safety of the blood and the safety of the donor. A history of recent illness or an anemic condition which would make the blood of poor quality and would involve a risk to the donor are looked for.

When the rumors about disease being spread by Red Cross blood plasma started, the Red Cross called a conference of representatives of the U. S. Public Health

Service, the Army, the Navy, the National Research Council, the blood fractionation laboratory at Harvard Medical School, and physicians and surgeons experienced in the field of blood transfusions. The rumors had gone so far that the State of New Jersey had refused to go along with other states on the new policy of Red Cross plasma distribution for civilian use.

The conference of experts, after considering the matter carefully, advised the Red Cross to continue to distribute blood plasma. The risks were so slight, these experts decided, and the occasional bad effects so rare that there was no reason for the Red Cross to change its policy of making plasma available to civilians after requirements of the armed forces had been met. This recommendation was made with the provision that doctors should understand when they use plasma that there is an element of risk, although that is true of any medication that may be given a patient.

New Jersey and all state health departments are now getting the surplus plasma and doctors are using it. State health departments are responsible for distributing it to doctors, hospitals and to stations or depots where it is available for use in case of disasters. Since the blood is donated to the Red Cross, no charge may be made for it.

*Science News Letter, August 3, 1946*

#### ECOLOGY

## Bikini Not Hollywood Type of Paradise

► AN ISLAND in the Dry Tortugas off the tip of Florida might give a fairly good idea of what the vegetation of a Pacific atoll such as Bikini looks like. It's all very hard on the glamorous visions made in Hollywood of lush glens full of tree-ferns, orchids and shy, brown-skinned maidens in sarongs.

That belongs, if anywhere, on larger islands like Samoa, where there is more soil. Life for tree and human beings is anything but easy in the low-lying, thin-soiled, scant-moistured Micronesian isles.

Native vegetation of all the Marshall Islands atolls follows a uniform, rather monotonous pattern. On the windward side of any island or islet there is an impenetrable thicket of tough-stemmed, hard-leaved bushes and trees forming a kind of natural barrier against the almost incessant wind. In the lee of this, the plant community opens out a bit forming what is called "dry forest." The trees and shrubs have the same hard, harsh leaves that we see in our own Southwest—or on our own beach dunes.

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## AERONAUTICS

# Jet Plane Carrier Landing

Navy's fastest jet plane makes successful test landings on aircraft carrier, proving that propellerless aircraft have future in the Navy.

► THE NAVY'S fastest airplane and one of the fleet's biggest ships teamed up recently in a preview of future Naval air power as the first jet plane landings on an aircraft carrier were made while the giant FDR steamed into the wind 60 miles east of Cape Henry, Va.

The sleek, bullet-nosed McDonnell Phantom, FD-1, whistled down to five successful landings on the big carrier's flight deck in the historic test flights.

With an announced top speed "in excess of 500 miles per hour," the single-seat Phantom became the first propellerless plane to land on a U. S. Navy carrier. Now in production for the Navy, the Phantom is designed as an interceptor and has a range of approximately 1,000 miles.

Unlike rockets, the twin axial-flow Westinghouse turbo-jet engines that power the Phantom spray back heat but no flame. Unlike conventional carrier planes, virtually no warm-up is required and the Phantom is ready to take off almost as soon as the engines are started.

Lt. Comdr. James J. Davidson, test pilot for the plane since the Navy began trials with it, says that the Phantom loses or gains speed less rapidly than conventional Navy planes but is easier to handle. He reported that the high-speed plane climbs rapidly and, with no propeller, gives the pilot better visibility and quieter flying without the torque caused by the motion of propellers.

Carrying test instruments on the carrier flights, the Phantom weighed 8,800 pounds compared with a fighting weight of more than 9,200 pounds.

Navy photographers and other technicians lined the deck of the Navy's newest large carrier gathering data on the flights, while cameras in the plane recorded instrument readings during the five tests.

After the successful flights, Capt. C. E. Giese, head of flight testing at Patuxent, Md., Naval Air Station where the Phantom was first flown by the Navy, predicted, "Jet aircraft have a great future on Navy ships."

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**FOLDED PHANTOM**—The Navy's fastest plane on the flight deck of the giant Franklin D. Roosevelt before spreading its wings to take off for the first jet plane landing on a carrier.

## MEDICINE

## Rare Type of Diphtheria Found Among Soldiers

► A RARE type of diphtheria has been brought to the United States by soldiers returned from the overseas theaters with skin diseases. A new problem of disease control has been created in Army hospitals.

The diphtheria differs from the common throat infection in that the diphtheria germ enters the skin through a wound or sore, and attacks the nose, throat, and ears, as well as the skin.

Virulent diphtheria germs were found in 1/20th of the patients sent to an Army hospital because of skin infections acquired in a tropical area. Nearly half of the other patients and workers in the skin disease wards were found susceptible to diphtheria, as measured by the Schick test.

A plan to check the spread of wound diphtheria has been reported by Maj. Eric Denhoff, Lieut. Maxwell Kolodny, Col. Worth Daniels, and Capt. Landis Mitchell, of the Army Medical Corps. Careful examination of incoming patients, isolation and quarantine of diphtheria patients, and Schick tests for all patients and workers are recommended, especially for hospitals caring for patients with skin diseases.

*Science News Letter, August 3, 1946*

## WILDLIFE

## Spring-Powered Harpoon Gun for Fishing

► SPORTSMEN who go in for spearing fish have a new weapon offered them in a spring-powered harpoon gun, on which G. O. Potter of Waubun, Minn., has been granted U. S. patent 2,404,249.

The short spear, with its barbed tines, is shoved into a pistol-gripped stock, compressing a strong coiled spring until a notch engages a dog actuated by the trigger. When the trigger is pulled the released spring drives the spear hard at its swimming target. Behind it trails a line to a reel on top of the stock, which enables the fisherman to haul in the fish.

This weapon can presumably be used also against fish that will put up a fight after being speared, like muskellunge in northern fresh waters, or barracuda and shark along the seacoast. For this purpose, of course, a good-sized reel carrying a long line would need to be mounted.

*Science News Letter, August 3, 1946*





**CHINESE TYPEWRITER**—This International Business Machines Electro-Automatic Chinese typewriter was designed at the suggestion by a Chinese engineer of a practical method by which the need for such a typewriter might be filled.

#### PHARMACY

## Sleeping Pill Law Asked

► HAVING a bottle of sleeping pills of the barbiturate class in your pocket or medicine chest, unless they were prescribed for you by a doctor, would make you liable to fine or imprisonment or both, under a law proposed by the American Pharmaceutical Association. Veronal, luminal and amyltal are some of the names under which these drugs are sold.

Like doctors and other professional groups, the pharmacists of the nation are "dismayed" at the misuse of this class of drugs, a misuse for which the professional groups claim they are not responsible.

Very useful when prescribed by a physician, these drugs are dangerous when used without medical supervision and have been responsible for numerous suicides.

The proposed law making possession of the drugs punishable was drawn up for submission to state legislatures as a step toward control of underworld and illicit use of barbiturates. More satisfactory control can be achieved by uniform state regulation than at the Federal level, it is believed by the pharmacists.

A wide variation and coverage in present state laws was found in a survey published in the *Journal of the American Pharmaceutical Association* (July). The following 12 states have no laws governing sale of barbiturates: Arizona, Idaho, Illinois, Iowa, Kentucky, Massachusetts, New Mexico, Ohio, South Dakota, Texas, Wisconsin and Wyoming.

The U. S. Food and Drug Administration has jurisdiction over barbiturates that have been in interstate commerce but provisions for Federal control are not adequate, pharmacists point out.

*Science News Letter, August 3, 1946*

#### ENGINEERING

## First Practical Chinese Typewriter Built

► ELECTRO-AUTOMATIC Chinese typewriter, the first ever built, contains a typeface cylinder upon which 5,400 Chinese type faces are engraved. The cylinder is electrically operated by 43 keys. Thirty-six numerical keys are divided into four groups, and any of the Chinese characters can be put into printing posi-

tion by striking one key in each group.

The machine is American-built and is a product of the International Business Machines Corp. of New York. In addition to the Chinese type faces, it is provided with an English alphabet, numerals, punctuation marks, and 40 Chinese phonetic characters for auxiliary purposes.

The electro-automatic Chinese typewriter can be used as an office typewriting machine, and can also be used as Chinese telecommunications equipment. Since the number system is already universal in China, this typewriter may be automatically linked up with all existing equipment in these related fields.

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#### RESEARCH

## Stalin Prize for Physiology Study

► THE STALIN prize has been awarded to Dr. Maria Petrova, leading woman physiologist of the U.S.S.R. who was Pavlov's principal assistant.

During the war in besieged Leningrad, she continued researches upon conditioned reflexes in animals, although she suffered extreme hunger and cold and sometimes lacked bare necessities. Studying the effects of air raids and shellings upon the nervous system, she contributed to the understanding of the physiology of war neuroses.

Another leading research by Dr. Petrova proved the curative value of bromides for certain kinds of neuroses. Now over 70, Dr. Petrova is studying how disorders of the nervous system stimulate cancer and the relation between the nervous system and old age.

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#### MEDICINE

## Camphor May Increase Production of Penicillin

► CAMPHOR is seen as a possible aid to increased production of penicillin.

Scientists at the University of Manchester have succeeded in creating, by treatment with camphor vapor, giant spores of a penicillium strain now used in making the drug. Even though the experiments, as reported by Dr. Eva R. Sanome in the British scientific journal, *Nature* (June 22), have caused no immediate increase in penicillin, future research with camphor and other strains of the mold may expand its production.

*Science News Letter, August 3, 1946*

## ARCHAEOLOGY

# Wall of Antiquity Found

A great wall recently discovered in Paraguay, with its ancient carvings, may be clue to a prehistoric race who left no other trace of their culture.

By MARJORIE VAN DE WATER

► A GREAT wall, 4,500 feet in length and at least 120 feet high, hidden for countless years within the heart of a mountain ridge, Cerro Cora, in the north-eastern part of Paraguay, may hold the secret of a past civilization.

This wall, judged by engineers to be an excellent work of engineering, is built of great blocks of red granite polished to a high luster on the face of the stone. On this polished face appear, it is reported, drawings portraying animals and footprints, both animal and human, and many signs which may be hieroglyphics. The blocks fit together with perfect precision.

The Indians of the region have no knowledge of the origin of this work. They have no tradition to give a clue as to the builders and what was their purpose.

Maj. Marcial Samaniego, director of the Administracion General Arqueologica, now charged with the care of this important antiquity, expressed the belief that both the wall and the carvings may have been the work of the Guarani Indians in prehistoric times.

If so, or if it is a monument of a still earlier people, the Guaranano, the discovery has great significance to archaeologists, for neither of these great tribes left behind a single material trace. The Guarani were reported to be great agriculturists and are credited with giving the world such important products as corn, tobacco, sweet potatoes and pineapple. But they built their houses, if any, of perishable materials—perhaps the same adobe and straw used in the country regions of Paraguay today—and nothing has ever before been found in all this section of South America to indicate what kind of culture they may have had.

Now practically extinct, this numerous tribe has thus left nothing as a heritage but a little folklore and their language, which is today the everyday language of the Paraguayan people.

Who built this wall? With what tools were the great blocks moved and the stone polished? Who put the "handwriting" on the wall and what is the significance of the signs? How did the moun-

tain ridge get in place covering the wall, or how was the great wall placed within the ridge?

These are some of the questions awaiting the arrival of scientists to study this site. Certainly the ridge has been right there during all historic times. It has a special historic meaning because it is the site where the war President Mariscal Lopez fell mortally wounded, leading his people in a war which cost the nation of Paraguay half the male population of military age.

Recently, a part of the ridge fell away, revealing the face of the wall with its undeciphered messages. The wall was first noted by Frederico Berger, a military man without special scientific interest, and later has been partly cleared and observed by the amateur archaeologist-engineer now charged with its care, Maj. Samaniego.

In the same general region with the wall, but in a completely separate place has also been found a trench formed also of two walls of stone. This trench is completely filled and sealed with ceramic clay. No one knows what lies hidden within.

Another object which may or may not have archaeological importance is a stone similar in appearance to a dolmen of gigantic size.

*Science News Letter, August 3, 1946*

## NUTRITION

## In-Plant Feeding Aids Workers in Factories

► A GOOD breakfast and between-meal snacks will greatly reduce a worker's chance of accident in industry, Miss Alice Zabriskie, industrial feeding specialist of the U. S. Department of Agriculture, told the American Home Economics Association meeting.

Pointing out that more industrial mishaps to workers occur before 11 a.m. than after noon, she declared that nutritious breakfasts can cut the number of accidents by 25%.

Miss Zabriskie urged industry to adopt regular in-plant feeding programs, and she reported that some companies have not only reduced accidents but also have

increased production by giving workers pints of milk or other nutritious snacks between meals.

Estimating that 60% of industrial workers need in-plant feeding facilities, she said snacks could increase efficiency, build morale and improve labor relations, cut the number of accidents, reduce turnover and save time.

One survey in an Indiana plant that served food showed that workers not only ate better food at work but 24% of them thought that they had improved their nutritional habits at home as a result of the program at work.

"Industrial feeding is recognized by plant management in the postwar period as an integral part of industrial organization," Miss Zabriskie said.

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## PUBLIC HEALTH

## Dishwashing Compounds Tested in New Method

► THE SPREAD of disease by dishes and silverware in public eating places may be slowed down by the U. S. Public Health Service's newest method of testing dishwashing compounds.

Since germs are harbored in greasy, hard water films and particles of food, a plate or fork cannot be sterilized, even with steam or chemicals, until it has first been properly cleaned.

Restaurants, bars, and dairies, using common cleaning compounds, can learn which ones are most effective through this new laboratory test developed by Edward H. Mann, assistant sanitarian, and C. C. Ruchhoft, principal chemist, of the U. S. Public Health Service.

Glass slides substituting for dishes in the test are covered with a special dirt mixture, then baked, examined, washed, rinsed, dried and re-examined. Since the human eye is not sensitive enough to detect and grade the amount of dirt remaining on a utensil the scientists used a photometer. Like the "electric eye" used in opening doors, the photometer is sensitive to light and dark areas. After passing through the washing machine, the dishes are again examined with the photometer, and the cleaning compounds used are graded for their efficiency.

The special dirt mixture used for the test is made of peanut butter, butter, lard, flour, dried egg yolk, evaporated milk, water, India ink, printing ink diluted with boiled linseed oil, a copper compound and sodium hydroxide.

*Science News Letter, August 3, 1946*



## ANIMAL HUSBANDRY

**Blue or Green Tattooing Marks Sheep, Horses**

► THE LEGENDARY monopoly of tattoos by sailors may be broken by sheep and horses with the report of successful experiments with colored tattooing to mark the animals.

C. E. Allen, associate chemist for the Dominion Department of Agriculture in Ottawa, Canada, reports that blue or green tattoos have been found to be a good permanent identification for two breeds of sheep and one breed of horses tested.

Horses are tattooed inside the lower lip, and the sheep are marked on an ear.

Colors were used for the tattoos after earlier use of black marks were found in some cases to become illegible. A lamb tattooed in black might be found to have a black ear when it matured, so colors are now being used.

While identification of sheep with the colored tattoos has been found effective, Mr. Allen says that marking horses on the inside lower lip requires special considerations. The actual tattooing of horses is relatively simple with two men and the horse placed behind a wall or gate. A twitch is applied to the upper lip and closely spaced, short, pointed needles are used.

Green and blue compounds have been found non-toxic, and a concentrated paste form of tattoo compound is used for the horses. No astringents or protective coatings are necessary, but the compound must set quickly.

Clydesdale horses were used for the experiments, but Mr. Allen believes that the tattoo identification on the lip will be satisfactory for all breeds.

*Science News Letter, August 3, 1946*

## MEDICINE

**Polio Death Rate Steadily Declining**

► THE DEATH rate from infantile paralysis is on the down grade. This news, especially cheering now while cases throughout the nation are mounting, comes from Metropolitan Life Insurance Company statistics covering one- to 14-year old children insured by that company's industrial department.

The standardized death rate for 1945 was less than two per 100,000 whereas in 1911 it was over five per 100,000. During the 1916 epidemic it rose to 36.8 and

in 1931, another big polio year, it was over six per 100,000.

Girls have benefited more than boys from the improvement in polio mortality among white children. From 1941 to 1945 the death rates for girls were on the average half those for boys.

The saving in lives has been greatest among children under five years. The peak of mortality now is at ages five to nine among white boys and 10 to 14 among white girls.

The improvement in the polio death rate is all the more significant because during the 35-year period physicians have increased their ability to diagnose the disease and a larger number of cases are being correctly reported.

Whether the decline in the death rate is due to fewer cases of the disease or to better treatment having saved more of those who got sick or both is hard to determine.

*Science News Letter, August 3, 1946*

## CHEMISTRY

**Chemical Draws and Holds Moisture From the Air**

► HOMES in humid climates may now be comfortable with a new chemical that picks up the moisture from the air. A few beads of the material in a salt shaker will keep the salt from caking. A handful in a toolbox will prevent rusting. Its greatest value, however, is in industrial applications. It can maintain low humidity in warehouses, storerooms and holds of ships. Already it has been applied to ship protection. Air, dried with it, is pumped through pipes to vital parts of idle war vessels to keep machinery and equipment in condition. It has particular value where grain, furs, textiles, lime and cement are stored.

The new material, technically a desiccant, is a product of Socony-Vacuum Oil Company, Inc., and has been named S/V Sovabead. It consists of spherical beads of uniform size. Each bead is honeycombed with microscopic pores that draw and hold moisture from the air, and is capable of adsorbing up to 40% of moisture. When saturated, it can be dried out by heating at 300 degrees Fahrenheit, and used over and over.

As compared with silica gel, the commonly used desiccant, the new material is extremely hard and durable, and does not become powdered to a fine dust. It can be used open in a room, or in an air-conditioning unit to dry the air as it passes through.

*Science News Letter, August 3, 1946*

**IN SCIENCE**

## BIOCHEMISTRY

**Inorganic Plastics Resist Fungus Growth**

► FUNGI grow on some plastics and not on others because of the organic material in the plastics. Wartime research by the Bakelite Corporation and Boyce Thompson Institute, under contract with the Office of Scientific Research and Development, showed that the inorganic components resist such growth.

The lubricants of animal or vegetable origin support fungus growth. Fungi do not grow on synthetic phthalate, vinyl resin, phosphate plasticizers, and inorganic components. Twenty of the 32 test cultures included tropical fungi. Of the fungus preventives tested, a top-quality, moisture-proof varnish was found to protect phenol-formaldehyde cotton-base laminates as well as any of the fungicidal finishes.

*Science News Letter, August 3, 1946*

## INVENTION

**Strut Invented to Anchor Helicopter**

► HOLD-DOWN device for helicopters, a type of equipment essential for planes with horizontally rotating propellers if building roofs and rolling ship decks are to be used for landing platforms, has recently been patented.

The device is a strut that can be extended, at will by the pilot, below the plane to engage itself, by means of barbs on its end, with one of the many openings in a grill fixed in the landing area. When ready to take off, the pilot operates controls that automatically retract the barbs and release the craft. Then the device is withdrawn into the body of the plane.

Automatic means are provided in the device for contracting the strut as soon as it engages the grill so that the plane is held tightly to the platform. One particular advantage of the invention is that it is able to hold a plane securely when the rotors are driven preparatory to a take-off.

Harold F. Pitcairn, Bryn Athyn, Pa., received patent 2,403,456 for this invention, and he has assigned it to Autogiro Company of America.

*Science News Letter, August 3, 1946*



# THE FIELDS

## PHYSICS

### Largest Van De Graaff Atom Smasher Being Built

► AN 8,000,000 electron volt Van de Graaff accelerator for use in atom-smashing is being designed at the University of California's atomic bomb laboratory.

The machine will be the world's largest practical operating voltage Van de Graaff generator. Highest known practical operating voltage for one of these machines is 4,000,000 electron volts, which was the energy achieved by the University of Wisconsin's accelerator when it was being used at the Los Alamos laboratory. The Wisconsin machine was recently returned.

A midget generator is already being constructed for testing materials and assembly techniques, and a pilot generator will be constructed later in the year. Building of the 8,000,000 volt atom-smasher will begin next year.

Dr. Joseph L. McKibben is the nuclear physicist in charge of the machine, which has been authorized by the Manhattan Engineer District.

*Science News Letter, August 3, 1946*

## ANTHROPOLOGY

### Ape-Man's Front Tooth Spacing Causes Debate

► BECAUSE Pithecanthropus IV, most recently found of the Java ape-men, found it easy to pick his front teeth, two leading American anthropologists are having a lively though friendly argument, conducted in the pages of the *American Journal of Physical Anthropology* (June).

This skull is the only one of this ancient humanoid species that has its upper teeth in place. Between the outer front teeth and the eyeteeth there is a little space.

Dr. M. F. Ashley Montagu of the Hahnemann Medical College, Philadelphia, regards this as an evolutionary link with the great apes, which have a noticeable gap in this position to accommodate the tip of the huge canine tooth jutting up from the lower jaw. In these apes this space is known technically as the diastema. Presence or absence of the diastema

is one of the things used in classifying the animals and determining their names.

Dr. Franz Weidenreich of the American Museum of Natural History in New York disagrees. He says the space in the Pithecanthropus IV skull does not justify setting this specimen apart from other Java ape-men as a separate genus. Not all great apes have diastemas, anyway, he declares: female orang-utans lack them, though their mates have them.

Probably the only way this debate can be settled will be by going out to Java and digging up some more Pithecanthropus skulls. As soon as things settle down over there this is likely to be done.

*Science News Letter, August 3, 1946*

## ENTOMOLOGY

### Grasshoppers May Prove Help In Grain Field

► FARMERS fighting off grasshoppers busily devouring the leaves of well-developed plants, leaving only bare stems with heads intact, will be surprised to learn that these greedy hordes can be a blessing in disguise.

While stripping the growing plants of leaves, during heading out and blooming, cuts down the grain to be harvested and its weight per bushel, loss of leaves just before the grain ripens may actually increase the total harvest. R. M. White, entomologist of the Dominion Entomological Laboratory at Lethbridge, Alberta, found.

To get an idea of the destruction caused by grasshoppers invading wheat fields, 'hopper damage was simulated in 12 of 15 plots of wheat, the other three being left as checks. In the first two plots the plants were cut off at ground level as soon as the plants were ½ to 1½ inches high.

Leaves were removed, leaving the main stems intact, from plants in the remaining plots in successive weeks. Each plot received the one defoliation only and was left untouched for the remainder of the season, as would happen if an invasion had been controlled at that time and the 'hoppers did not return.

Plants that had been defoliated were all slightly shorter than those of the check plots, Mr. White reported to the Agricultural Institute of Canada. The number of heads per plant was also greatly reduced when the leaves were cut from the plant during the second to the fifth week.

*Science News Letter, August 3, 1946*

## VETERINARY MEDICINE

### Relief for Animals from Pests and Parasites

► HOUSEHOLD pets, poultry and farm animals may be happier in the future because of materials developed during the past few years to rid them of both inside and outside parasites, Dr. R. E. Rebrassier of Ohio State University recently told veterinarians from six states.

Research has provided chemical and other weapons to cope with many of the most damaging parasites.

Some of the newer materials include DDT, mixtures of rotenone, a new remedy known as Formula M.S. 793F, cerbinol, hexachlorobenzene (666), phenothiazine and sodium fluoride, and also British developed gammexane.

"Gammexane, unlike DDT, appears to be quite effective in destroying mites," Dr. Rebrassier reports. "This new agent may prove useful in combating sheep and cattle scab, poultry mites, and various forms of mange in dogs and other animals."

Cerbinol is recommended for ringworm in cattle and foot rot in cattle and sheep, and also for moist eczema and ear canker in dogs. The 666 gives promise of being one of the best chemicals to rid the intestines of ascarids, common parasitic worm.

*Science News Letter, August 3, 1946*

## BIOLOGY

### Water Temperature Effect On Shipwreck Victims

► ONLY A FEW shipwreck victims, if any, could survive immersion for more than one hour in water as cold as 30 degrees Fahrenheit. At higher temperatures, men can survive longer and at temperatures of 68 to 70 degrees immersion of 60 hours or perhaps longer could be survived.

These figures appear in a report by Dr. G. W. Molnar, of the University of Rochester School of Medicine and Dentistry, in a report in the *Journal of the American Medical Association* (July 27). They were obtained from reports of rescues at sea in the files of the Navy's Bureau of Medicine and Surgery.

Ability to survive immersion in water at temperatures below about 68 degrees Fahrenheit is limited by the loss of body heat at a rate which exceeds heat production, Dr. Molnar states.

*Science News Letter, August 3, 1946*

## PHYSIOLOGY

# "Explosions" in Wounds

High-velocity bullets cause explosions in wounds, the intensity of which breaks bones. Research into this solved a wartime medical problem.

By FRANK THONE

► MOST of the wounds suffered during the war have healed by now. A lamentable number of young men will have to go through life minus a leg or an arm. The number of amputees would have been even larger, however, but for some research conducted during the war on the nature of wounding by high-velocity missiles, and only now being disclosed to the general public.

Military surgeons have long had a pretty good idea of the nasty injuries that can be inflicted by jagged chunks of flying metal from such missiles as artillery shells, airplane bombs and hand grenades. Land mines were something new to the recent war, but they were not unlike explosion injuries often sustained in such hazardous trades as mining and quarrying.

There was a tendency, though, to be a little bit complacent about bullet wounds. The bullets used in modern military rifles and machine guns, much smaller than the old-fashioned lead slugs

they replaced a half-century ago, covered moreover with harder metal, were supposed to make "nice, clean wounds."

But the hard facts of war did not bear out this optimistic notion about the humaneness of high-velocity, jacketed bullets. The wounds were often slow in healing. Moreover, a wound in arm or leg frequently showed a broken bone, though the bullet had not passed anywhere near the bone. The patients also often showed symptoms of shock, much more profound than a "nice, clean" bullet should have caused.

What was the matter? That was what a four-man research team in the physiology laboratories at Princeton University set out to discover. The team consisted of Prof. E. Newton Harvey, Prof. E. G. Butler, Dr. J. H. McMillen and Dr. W. O. Puckett.

Two relatively new pieces of scientific apparatus made their research possible. One is the ultra-high-speed motion picture camera, which takes thousands of frames in a second instead of the conventional 16 of ordinary cameras. That

would show what happened on the outside of the target when the bullet struck. The other is the microsecond X-ray apparatus, for which the exposure is a millionth of a second. That would get pictures of the target as the bullet struck, as it passed through, as it went on out the other side.

Obviously, human arms and legs could not be used in the experiments. Volunteer human guinea pigs will cheerfully let themselves be half starved, will swallow deadly germs, will take staggering electric shocks, in the cause of medical science. But asking a man to stand up and get shot in the leg is something else again.

Stray dogs and cats, already ticketed for the gas chamber anyway, were drafted as substitutes. Even they were not shot while alive and conscious. They were given doses of a well known sleeping drug—doses so heavy that they would never wake up again. Then, just as the faltering heart-beat told that life was passing out, one leg would be placed in front of the muzzle of a rifle on a fixed stand and the test shot fired. An electrical connection to the motion-picture or X-ray camera would insure exposures at just the right hair-split fraction of a second.



**WOUND PROBLEMS**—Ordinary X-ray shots of a test animal's leg before (left) and after (center) a high-velocity pellet had been shot through it show how the bone has been broken by pressure changes even though some distance from the bullet hole. The picture at the right is an X-ray taken with an exposure of one millionth of a second and shows the temporary cavity made when a high-velocity shell fragment hits.



The bullets used in these experiments were scaled down to the size of the flesh-and-blood targets at which they were fired. They were eighth-inch and three-sixteenth-inch steel balls, and small cylindrical slugs of comparable size, fired from a specially mounted rifle barrel at velocities around 3,000 feet a second.

The super-speed motion pictures of the outside of an animal's leg showed that just after the bullet had penetrated there was a sudden bulging of the tissues along its path. This bulge came and went so quickly that the human eye could not discern it. Postmortem dissection showed considerable damage and disorganization of the tissues in a very large area around the missile's path, and very likely a broken bone.

When the test was repeated before the millionth-second X-ray camera, it could be seen that when the bullet hit, the tissues leaped away from it in every direction, leaving an empty space for a minute fraction of a second. Blood vessels and nerves were pushed violently aside, often with rupture of the trunks. The break in the bone could be seen.

It was very much as if a pinch of TNT had been planted inside the limb and then detonated. It explained the wide areas of messed-up tissue around high-velocity bullet wounds, and certainly indicated that there is no such thing as a "mere flesh wound"—at least when the injury is inflicted at close range. Low-velocity missiles do not produce these explosive effects.

To get a simplified picture of what goes on when a high-velocity bullet strikes, Prof. Harvey and his colleagues fired similar missiles into water, and into blocks of gelatin. When the bullet struck either water or gelatin, there would form a V-shaped wake of rarefied air behind it. In an instant this would contract and clump itself into an irregular cavity, which would go through several writhings and contortions before it would disappear. So much energy was given off by the projectile in producing this effect that in one instance a block of gelatin jumped four feet into the air after the steel ball had passed completely through it.

The shots into water showed another thing very clearly. At the instant of impact, a compression wave started through the water, and kept ahead of the bullet as it penetrated. Where it struck the surface, it started a second, or reflection wave. All this shows up on the photographs, with the wave fronts clearly marked by shadowy arcs. It all looks very much like the diagrams that seismologists draw of earthquake waves moving through the interior of our planet.

Results of the whole study were made available to surgeons in the armed forces, and to the medical profession generally. They did much to improve the treatment of short-range bullet wounds, and the quite similar effects found in wounds caused by high-velocity steel splinters from exploding shells and bombs.

*Science News Letter, August 3, 1946*



**HOME RECORDER**—Radio programs, speeches and greetings to friends may be recorded on paper tape in this set designed for home use.

the more true to life the voice sounds. When almost eight inches of tape pass through the recording-reproducing mechanism each second, music and people's voices sound as natural coming from the recorder as when coming over a good radio with a ten-inch speaker.

The magnetic tape works in much the same manner as magnetic wire. The amplifier converts the sound of a person speaking into the microphone into electric impulses which vary in tune with the sound vibrations. These electric impulses produce equivalent vibrations in the magnetic field of the machine, which impulses are in turn recorded on the moving tape. The process is reversed for play-back. The magnetic pattern on the wire is reconverted into electric currents which are in turn converted into sound through the machine's amplifier and speaker.

Magnetic tape recording was developed during the war under the auspices of the Office of Scientific Research and Development by the Brush Development Company which, even before Pearl Harbor, had begun investigating this type of device. When American Army technical men went into Germany, they found that there had been a parallel development in Germany during the war. This has since been exhibited in the United States.

*Science News Letter, August 3, 1946*

At the present increase in the American thirst for milk, by 1950 consumers will require 24% more milk than they did before the war.

#### PHYSICS

## Voice Recorded On Paper

**Easy-to-handle magnetic tape records human voice, radio programs, etc. Reproduction is obtained by reversing the process.**

► PAPER STRIP coated with iron oxide is the latest device for sound recordings. This magnetic tape, simple and easy to handle, promises to be the favorite sound recording method because of its cheapness.

In the home it will preserve radio programs, family discussions and baby's first words. Recording of a timeless symphony can be retained indefinitely while swing music can be played back for a while, then erased and the tape used again. This light-weight paper tape can be used to play back one recording as many as 1000 times. Or 500 different programs can in

turn be recorded and played back just once.

A quarter-inch wide, the magnetic tape has sufficient body to handle easily. Should it break in use, there is no backlash to snarl the ends. The broken ends can simply be pasted together and it is ready for use. Magnetic wire, on the other hand, is almost as fine as a human hair and once broken is difficult to thread back into place.

The fidelity of the recording depends largely on the rate at which the tape is run through the recording-reproducing mechanism. The faster the tape moves,

## Do You Know?

Tomatoes were eaten by the Incas of Peru centuries ago.

Stow-away beds, with magnesium frames, are promised for sleeping cars; magnesium is used to give them lightness.

Citric acid is produced now mainly by mold fermentation instead of from citrus fruits; its principal uses are in soft drinks, confectionery and medicine.

Natural rubber demand will exceed the supply until full production is reached again; later the demand may be less than production capacity.

There is enough gold in the oceans to give each of the 2,000,000,000 inhabitants of the earth \$15,000 worth, but the cost of obtaining it is more than this amount.

An easy way to apply DDT to hens to control lice, rat fleas and bedbugs is to scatter a 10% DDT dust on the litter on the poultry house floor; as the hens scratch, they throw the dust into their feathers.

Japan, with little domestic coal for heating or cotton or wool for clothing, must now rely upon its extensive forests for fuel, construction materials, and as raw material for rayon for garments and other purposes.

Bakers' cheese can now be made from dried skim milk, instead of from the liquid form; the product can be made near the bakeries where it is to be used, obviating the heavy transportation and freezing costs incurred when liquid skim milk is used.

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## AERONAUTICS

# Safe Aviation Fuel Wanted

Crash accidents have proved need for non-vaporizing, high-octane gasoline for aviation. Wartime developments too costly for civilian use.

► **WANTED:** a safety fuel for aircraft—one less liable to cause fire within engine housings or explosions in crash-landings.

Some types have already been developed. Scientists had produced before the war what they called a "safer high octane aviation gasoline." A still safer product will probably soon appear.

The war directed attention to other projects, but it has swung back again. The problem now is the improvement of the prewar fuel, the development of economical manufacturing methods, and the adaptation of engines so that it can be used.

Just a year ago, the Standard Oil Company of New Jersey publicly demonstrated an aviation fuel developed by it that is so resistant to accidental ignition that a lighted match can be dropped in it without causing a fire.

The safety feature of this gasoline is the fact that it does not form inflammable vapors in the air in great enough quantity to ignite, unless it is at temperatures above 100 degrees Fahrenheit. Ordinary motor and aircraft gasolines do, and they ignite readily and burn rapidly because of the vapors formed.

This safety fuel is much like kerosene. Kerosene, the world over, is regarded as a safe fuel because it does not vaporize dangerously until heated to 100 degrees or over. This is one advantage in the use of kerosene as fuel in jet-propulsion planes.

One disadvantage of the fuel demonstrated is that it must be fed into engines by direct injection rather than through ordinary carburetors. Unless suitable carburetors are developed, engines now in use will have to be converted for fuel injection if the new gasoline is to be used.

The demand for safety fuel, now much alive because of recent aircraft accidents, originated at least two decades ago. The Standard Oil Development Company has long worked on the problem. The object was to make a fuel with the power characteristics of 100-octane but which would be as safe as kerosene.

Scientists had little difficulty in raising the flash point of aviation gasoline, but

they encountered a serious problem in lowering the volatility so that it would not vaporize easily. When they succeeded, some was produced for experimental purposes, but the cost was very high. It was produced by the then new hydrogenation process.

Manufacturing methods were improved later, and the new safety fuel was used by the Navy in testing fuel lines, pumps and fuel tanks on airplane carriers. Leaks could be located without danger. The Army also tried the fuel in airplanes but found it unsatisfactory in combat for reasons that would not apply at all in commercial aviation.

Science News Letter, August 3, 1946

## INVENTION

### Heat Process for Peeling Vegetables

► **POTATOES**, carrots and other vegetables can be peeled in great quantities, for dehydration, canning or other processing, by brief exposure to high radiant heat, states a U. S. Department of Agriculture scientist, George T. Hemmeyer of Berkeley, Calif., in his preamble to patent 2,403,923. The heat literally cooks the skins off them, leaving the rest of the flesh unaffected.

His invention is an oil-heated, brick-lined furnace, through which the vegetables are rolled by a spiral fin mounted on a long cylinder. Their rate of travel is so adjusted that they get just the right amount of heating-up to peel them properly.

Rights in the patent are assigned royalty-free to the government.

Science News Letter, August 3, 1946

## RADIO

### Miniature Radio Doubles As Radio and Watch

► A **VEST-POCKET** radio receiving programs from a special short-wave station is the latest postwar broadcasting development. The new radio, half the size of a package of cigarettes, will double as a radio and watch, with time reports being received at regular inter-



vals 24 hours a day from the new station.

The Federal Communications Commission will soon hold hearings on the applications of Electronic Time Inc., for the 2-kilowatt station to be operated on 25 to 30 megacycles. The station, with a broadcasting radius of only 25 miles, will be operated atop the Lincoln Building in Manhattan, if the commission approves the request.

The fixed frequency receivers are expected to be a boon to blind persons, replacing braille watches with time

announcements on them.

It is planned that the new station will also carry news reports and weather forecasts. If the trial here is successful, Electronic Time Inc., hopes to be able to establish a nation-wide service.

In addition to the vest-pocket receiver, desk and home sizes are planned. The latter can be set up as an alarm clock to pick up the time signal at a predetermined time.

Numerous military applications are forecast for the new receiver.

*Science News Letter, August 3, 1946*

#### MEDICINE

## New Attacks On Virus

**Thyroid gland extract, local and general anesthetics, may be possibilities in future treatment of polio, encephalitis and other virus-caused diseases.**

►WHEN INFANTILE paralysis epidemics break out at some future date, children may get doses of thyroid gland extract to protect them from the disease. Older people might get a thyroid-slowng drug, thiouracil.

If anyone does contract the disease, he might be saved from painful muscle spasm and paralysis by injections into nerves along the spine of a local anesthetic solution.

Or light sleep induced by ether or some other general anesthetic might become the future treatment for polio and such other virus-caused diseases of the nervous system as encephalitis, encephalomyelitis of horses and man, and the like.

These possibilities, and none of them is more than that so far, are hinted in reports to the scientific journal, *Science*, (July 19).

The thyroid suggestion comes from studies on mice by Dr. D. Frank Holtman of the University of Tennessee.

The injection of local anesthetics, technically termed nerve block, is being studied in relation to polio by Dr. Norman Nelson of the University of California at Los Angeles.

Success in treating western equine encephalomyelitis in mice by ether anesthesia is reported by Drs. S. Edward Sulkin, Andres Goth and Christine Zafonotis of Southwestern Medical College, Dallas, Texas.

In trying nerve block for polio, Dr. Nelson follows the idea that change in the circulation of the spinal cord is one of the things that determines whether

a polio patient will have muscle spasm and will be left with a paralyzed arm or leg.

"Overwhelming evidence," he says, "exists that disturbed circulation of the spinal cord is one factor in the production of paralysis in poliomyelitis."

He cites the case of a child who harbored the polio virus in his body for 19 days, seven to 14 being the usual period before the disease develops. The child remained well until immediately after a canoe race in which his arms were used as paddles. Then he developed paralysis in his arms only.

Disturbed circulation in the arms may have disturbed the circulation in that part of the spinal cord nerves supplying the arms and allowed the polio virus to attack the nerves. Blocking the nerves to an arm will increase circulation to the arm, Dr. Nelson points out. It might also increase circulation to the part of the spinal cord nerves supplying the arm. And that might determine whether or not the arm would be paralyzed by the polio virus.

Results of the studies so far are too few to warrant any conclusion that the nerve block is a treatment for polio, Dr. Nelson warns. He hopes that other scientists will study the same problem.

It took polio virus twice as long to kill mice treated with thyroid substances as to kill untreated mice, Dr. Holtman found. The thyroid-slowng drug, thiouracil, brought on paralysis faster with earlier deaths in polio-infected mice not given this drug.

Young mice, which tend to be more

susceptible to the virus, were protected longer by thyroid extract than older ones, which leads Dr. Holtman to the idea that the method, if it proves practical, may be useful only at certain ages in humans.

Trial of the thyroid-stimulating and slowing substances followed his earlier discovery that mice could tolerate polio virus much better when the animals were acclimated to low temperatures. Thyroid gland secretion is known to be greater on exposure to cold.

The reason for the Dallas group trying ether as a remedy for equine encephalomyelitis in mice is that general anesthetics come up to the following specifications for an ideal remedy for such diseases: 1. ability to cause reversible changes in body cells sufficient to destroy the virus without damaging the body cells; 2. partiality for cells of the central nervous system, a partiality shown also by viruses that cause polio, encephalitis and similar diseases.

Almost half, 42%, of mice given the ether treatment survived 10 days after killing doses of equine encephalomyelitis virus, but only 7.6% of the untreated mice survived the same dose for the 10-day observation period.

*Science News Letter, August 3, 1946*

Venezuela's petroleum production in 1945 was over 26 per cent greater than during 1944; Venezuela occupies second place among the world's oil producing countries.



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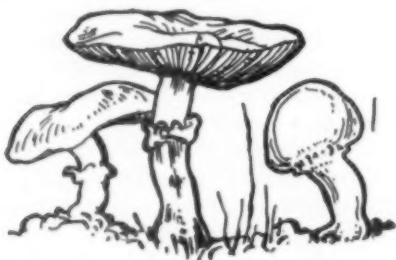
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BOTANY

# NATURE RAMBLINGS

by Frank Thone



## Mushroom or Toadstool?

► "REALLY, I'd like to take them along and cook them, but I don't know whether they're mushrooms or toadstools."

How often have you heard people say something like that?

There seems to be a widespread notion that if a fleshy fungus is good to eat it is a mushroom, and that if it is poisonous it is a toadstool. Actually, however, the two names are completely synonymous: every mushroom is a toadstool, and every toadstool a mushroom. That is because mushroom and toadstool are shape-names, not class-names distinguishing between edibility and unwholesomeness. Any fleshy fungus with a stalk and a more or less circular cap is a mushroom. It is also a toadstool.

Not all the fleshy fungi are included in this mushroom-toadstool group. Puffballs, coral fungi and tooth fungi, for example, are neither mushrooms nor toadstools: they are not the right shape,

though they are botanically related to the mushrooms. On the other hand, the edible morel, one of the tastiest of wild fungi, is much less closely related to most mushrooms than are puffballs, yet it is commonly called a mushroom because it has a stalk and at least a kind of cap.

There is no ready way to distinguish between edible and inedible mushrooms. Rule-of-thumb tests, like peeling the cap, dark color underneath, and turning a silver spoon black, are all unscientific and completely unreliable. There are good and bad mushrooms that peel, good and bad ones that don't peel. As for gill color—well, the one mushroom commonly sold on the market is dark brown to black underneath when it is ripe, and the deadliest of all poisonous kinds, the *Amanitas*, are always innocently white! No, the only way to be sure of your wild mushrooms is to turn botanist to the extent of learning each species and knowing definitely which are edible and which are not.

One group of ready recognition characters will enable you to know—and so avoid—the deadly *Amanitas* when you meet them. The base of the stalk is enclosed in a ragged-edged cup, or at least has the fragments of a cup clinging to it, and half-way or more up the stalk is a ring, which sometimes hangs down like a veil. Some edible mushrooms have cup but no ring, others ring but no cup; but only *Amanita* has both. Further to complicate matters one of the best of all mushrooms is a non-poisonous *Amanita*—but it is safest for the amateur to pass this one up and avoid all *Amanitas*.

*Science News Letter, August 3, 1946*

## CONSTRUCTION

### No Rafters and Trusses In New Building Method

► HERE IS something new:

House-construction using self-strengthening arches on posts, eliminating all need for rafters or trusses in the roof and for load-bearing walls.

Suitable for use in both temporary and permanent buildings, the technic has been tried and tested. It was employed in constructing a war housing project of 160 houses and a community center at Sidney, N. Y.

The new system is called "ratio structures." It is based on arches supported on a series of free standing posts. The posts and arches are erected first, then the building is erected from the roof down, rather than from the ground up.

The new system can be used with metal, plywood, or composition board. Windows and other openings may be placed where wanted because the outer wall panels bear no weight, being actually supported by the roof-post system.

Instead of the arches, standard box-girder flat roof can be used. The space within the box-girder can be used for air circulation, for insulation, and even for the installation of plumbing pipes, electric wiring, and heating and ventilating ducts.

A description of the new type of construction is available from the Office of Technical Services, U. S. Department of Commerce. It is written by the man who developed the structural system, Paul Lester Wiener of the former War Production Board.

*Science News Letter, August 3, 1946*

## MEDICINE

### Body Defense Mechanism Fights Pneumonia Germs

► DISCOVERY of a hitherto unknown defense of the body against pneumonia germs is announced by Drs. W. Barry Wood, Jr., Mary Ruth Smith and Barbara Watson of Washington University School of Medicine and the Oscar Johnson Institute for Medical Research at St. Louis.

Some quality of the surface of lung tissue and of other tissue, these scientists find, allows white blood cells and other scavenger cells of the body to destroy pneumonia germs without the aid of special antibodies.

This is contrary to previous ideas on the subject. Current medical books tell you that virulent pneumonia germs are protected from scavenger cell destruction by the sugary capsule surrounding each pneumonia germ. Only when a special antibody called opsonin is present to help can the scavenger cells gobble up pneumonia germs, capsule and all.

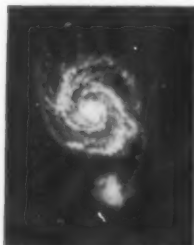
This failed to reveal why untreated patients sometimes recover from pneumonia before a specific antibody is found in their blood or why sulfa drugs usually bring about a crisis leading to recovery several days before immune substances appear in the pneumonia patient's blood.

The new discovery gives an adequate answer to these unsolved questions.

In their report to the scientific journal, *Science*, (July 12), the St. Louis scientists hint that the newly discovered defense mechanism may operate against other capsulated germs.

*Science News Letter, August 3, 1946*

## ASTRONOMICAL PHOTOGRAPHS



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# Books of the Week

**THE BACONIAN LECTURES ON AIMS AND PROGRESS OF RESEARCH IN THE STATE UNIVERSITY OF IOWA: 1945**—*Univ. of Iowa*, 121 p., paper, \$1. Reports of research in biological sciences, chemistry, history, language, economic science, applied arts, engineering, psychiatry, child welfare, medicine.

**BLUE-WATER MEN AND OTHER CAPE CODDERS**—Katharine Crosby—*Macmillan*, 288 p., illus., \$3.50. A book written by a Cape Codder about the Cape, its houses, churches, people, and stories.

**CAMPS AND COTTAGES: How to Build Them**—Charles D. White—*Crowell*, 260 p., illus., \$3., rev. ed. Plans enabling a person with no experience to build a cottage, camp, guest house, or outdoor furniture and equipment for cooking.

**CLASSIFICATION OF BARLEY VARIETIES GROWN IN THE UNITED STATES AND CANADA IN 1945**—Ewert Aberg and G. A. Wiebe—*Government Printing Office*, 190 p., tables and illus., paper, 35 cents. U. S. Department of Agric., Technical Bull. No. 907.

**DIABETIC CARE IN PICTURES: Simplified Statements with Illustrations Prepared for the Use of the Patient**—Helen Rosenthal, Frances Stern, and Joseph Rosenthal, M.D.—*Lippincott*, 150 p., illus., \$2. A book to serve as part of the diabetic's equipment so that he may understand diabetes and its treatment and give fullest cooperation to the physician.

**ECHINODERMS FROM THE PEARL ISLANDS, BAY OF PANAMA, WITH A REVISION OF THE PACIFIC SPECIES OF THE GENUS ENCOPE**—Austin H. Clark—*Smithsonian Institution*, 15 p., illus., paper, 15 cents. Smithsonian Miscellaneous Collections, Vol. 106, No. 5.

**EMERGENCY SURGEON**—Paul H. Osiek, M.D., and Robert S. Richardson—*Dorrance*, 291 p., \$2.50. A behind-the-scenes account of the cases that come to the Emergency Hospital, written in the form of an autobiography but having the broader aim of discussing problems which medicine and society must meet.

**FORENSIC CHEMISTRY AND SCIENTIFIC CRIMINAL INVESTIGATION**—A. Lucas—*Longmans*, 340 p., tables, \$7., 4th ed. A treatise, revised and brought up-to-date, on the use of chemistry in the solution of certain problems that arise in connection with the administration of justice.

**FOREST SOILS AND FOREST GROWTH**—S. A. Wilde—*Chronica Botanica*, 241 p., tables and illus., \$5. The origin and general properties of forest soils, their physics, chemistry, and biology, relation to forest vegetation, and importance in silvicultural management. The subject matter of a course given for upper class and graduate students in forestry, soils, and botany.

**HOW TO PICK A MATE: The Guide to a Happy Marriage**—Dr. Clifford R. Adams and Vance O. Packard—*Dutton*, 215 p., \$2.75. The questions everyone has about marriage fully answered by up-to-date scientific knowledge and the inclusion of psychological tests.

**INDUSTRIAL ELECTRICAL CONTROL**—E. S.

Lincoln—*Duell*, 374 p., tables and illus., \$3. A manual for the study of the control equipment by means of which the basic voltage of all electrical apparatus is regulated. Describes the fundamentals of control by resistance, reactance, electronic means, and switching.

**INDUSTRIAL ELECTRIC HEATING AND ELECTRICAL FURNACES**—E. S. Lincoln—*Duell*, 192 p., tables and illus., \$3. An analysis of the fundamentals of resistance heating; of induction heating apparatus which employs low and high radio frequencies; and of the various uses of electric steam boilers, industrial heating cables, and electric furnaces.

**INVESTIGATIONS IN EROSION CONTROL AND RECLAMATION OF ERODED SANDY CLAY LANDS OF TEXAS, ARKANSAS, AND LOUISIANA AT THE CONSERVATION EXPERIMENT STATION, TYLER, TEX., 1931-40**—*Government Printing Office*, 76 p., tables and illus., paper, 20 cents. U. S. Department of Agric., Technical Bull. 916.

**MAMMALS OF SAN JOSE ISLAND, BAY OF PANAMA**—Remington Kellogg—*Smithsonian Institution*, 4 p., paper, 5 cents. Smithsonian Miscellaneous Collections, Vol. 106, No. 7.

**MATHEMATICS: A Historical Development**—Lee Emerson Boyer—*Holt*, 478 p., illus., \$3.25. The most important and practical topics of arithmetic, algebra, geometry and trigonometry couched in a historical setting, a book aimed at providing the general student some means of learning about the nature and use of mathematics from early times to the present.

**MOTHER AND BABY CARE IN PICTURES**—Louise Zabriskie—*Lippincott*, 203 p., illus., \$2., 3rd ed. A book primarily for expectant mothers and fathers, but also useful as a maternity guide for practical nurses. In this 3rd ed. emphasis has been placed on nutrition, mechanism of labor, and the care of the baby.

**THE NORTH AMERICAN CLEAR-WING MOTHS OF THE FAMILY AGERIIDAE**—George P. Engelhardt—*Smithsonian Institution*, 222 p., illus., paper, 75 cents. United States National Museum, Bull. 190.

**A PRIMER FOR STAR-GAZERS**—Henry M. Neely—*Harper*, 334 p., illus., \$3.75. A practical book enabling the novice to find any visible star or constellation. Includes "sky-pictures" and star calendar.

**PRIMEROS AUXILIOS: Quirúrgicos y Médicos**—Warren H. Cole, M.D. and Charles P. Puestow, M.D., Trans. into Spanish by Dr. Ramón Rodríguez de Mata—*Appleton-Century*, 474 p., illus., \$3.75, 2nd ed. Translation of *FIRST AID: Surgical and Medical*.

**PROCEEDINGS VOLUME OF THE GEOLOGICAL SOCIETY OF AMERICA FOR 1945**—*Geological Society of America*, 339 p., illus., paper, \$1.50.

**SOUL OF LODESTONE: The Background of Magnetical Science**—Alfred Still—*Murray Hill Books*, 233 p., \$2.50. A history of man's thoughts about magnetism and of the uses to which he has put it.

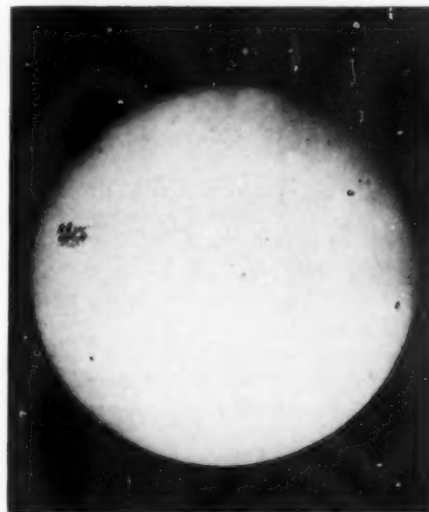
**SWITCHBOARDS AND PANELBOARDS**—E. S. Lincoln—*Duell*, 150 p., tables and illus.,

\$3. A description of the construction, operation, and maintenance of switchboards and panelboards, and of the various modern industrial uses to which these are put.

**TAHITI LANDFALL**—William S. Stone—*Morrow*, 308 p., illus., \$3.50. A view of an island paradise and of a life of incredible ease.

**THE VEGETATION OF SAN JOSE ISLAND, REPUBLIC OF PANAMA**—C. O. Erlanson—*Smithsonian Institution*, 14 p., illus., paper, 15 cents. Smithsonian Miscellaneous Collections, Vol. 106, No. 2.

*Science News Letter, August 3, 1946*



**SUNSPOT**—Enormous spot on the sun caused the brilliant auroral display in northern latitudes and short-wave radio broadcasts to be blacked out over the week-end of July 26. The sunspot is shown as it appeared on July 22 in this photograph by Mrs. L. T. Day of the U. S. Naval Observatory. It was large enough to be seen through smoked glass.

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# •New Machines And Gadgets•

☼ **ROOFTOP** insulation which can be applied with an ordinary paint brush or spray gun reflects 80% of the sun's rays and reduces interior temperatures by as much as 15 degrees. The paint dries in one hour to form an aluminum, foil-like protective shield.

Science News Letter, August 3, 1946

☼ **AUTOMOBILE** battery fits ordinary battery cradles but needs little attention as its water-capacity is three times that of ordinary batteries. It is in a hard, durable rubber container and has fiberglass insulation which prevents loss of power-producing active material from the plates.

Science News Letter, August 3, 1946

☼ **BED ATTACHMENT**, extending crosswise under the bed covers to relieve patients of the weight of the bed clothes over injured parts, is an arch-shaped frame with adjustable end clamps to fasten it to the bed rails. The supporting arch can be moved forward and back, and also can be raised or lowered.

Science News Letter, August 3, 1946

☼ **RUBBER** anchors for scatter rugs help reduce accidents by keeping rugs from slipping on highly polished floors. The protective underlay, a sponge rubber cushion, can be cut to fit any size rug or runner. It can be cleaned with a damp cloth.

Science News Letter, August 3, 1946

☼ **TRI-VISION** camera and companion viewer are modern counterparts of the



Victorian stereoscope and stereoscope camera. Pictures taken in the twin-lensed camera are put into a slot in the viewer, where, illumined by the enclosed batteries, they are seen in three-dimensions.

Science News Letter, August 3, 1946

☼ **COMBINED** ironing board and stepladder has the customary crossed legs, but they pivot in their centers. Crossarms on each pair of these legs form the steps for the ladder, and the ironing board itself becomes the support to hold the ladder upright.

Science News Letter, August 3, 1946

☼ **EASY-TO-FIND** vanity case fits into

a holder which is neatly pinned on to the dress or lapel. Sides of the holder are flush with the front of the vanity case, and contain finger notches for easy removal.

Science News Letter, August 3, 1946

☼ **DELIVERY RACK** of cardboard for carrying neckties from the cleaners has several T-shaped slots for receiving ties without crushing, and for holding them firmly in place during delivery. Rack can be made cheaply enough to be left free with each customer.

Science News Letter, August 3, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 322. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

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## Question Box

### AERONAUTICS

Do jet planes have a future with the U. S. Navy? p. 69.  
How does fuel affect airplane accidents? p. 76.

### ARCHAEOLOGY

In what South American country was an ancient wall recently discovered? p. 71.

### BIOLOGY

Why are shipwreck victims unable to survive in water temperatures below about 68 degrees Fahrenheit? p. 73.

### BOTANY

Is there any sure way to distinguish between mushrooms and toadstools? p. 78.

### ENTOMOLOGY

In what way are grasshoppers helpful to farmers? p. 73.

### INVENTION

How does the new anchor for helicopters work? p. 72.

### MEDICINE

How does the medical profession feel about the rumors on the use of blood plasma from the Red Cross? p. 68.

Is the death rate from polio decreasing or increasing? p. 72.

What new attacks are being made on diseases caused by viruses? p. 77.

### PHYSICS

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### PHYSICS-OCEANOGRAPHY

What two vast wildernesses are being brought together in research? p. 66.

### SEISMOLOGY

What is the Darwin theory proved by the atomic blasts at Bikini? p. 67.

### SURGERY

How does a bullet shot into the leg break the bone even though it penetrates far from the bone? p. 74.

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